# Revision 1
# Sampling and Analysis Plan
# for
# Libby Sister Sites (Asbestos Project)
# Former Vermiculite Intermountain Facility-SLC2
# Salt Lake City, Utah

## EPA Region VIII



## July 2003

Contract No. DTRS57-99-D-00017
Task Order No. C0023

Prepared for:

U.S. Environmental Protection Agency - Region VIII
Emergency Response Office
Denver, Colorado

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# Acronyms

| | |
|---|---|
| AHERA | Asbestos Hazard Emergency Response Act |
| ACM | asbestos-containing material |
| AIHA | American Industrial Hygiene Association |
| ASTM | American Society for Testing and Materials |
| CDM | CDM Federal Programs Corporation |
| CDM Inc. | CDM Incorporated |
| $cm^2$ | square centimeter |
| COC | chain-of-custody |
| DI | deionized |
| DPT | direct-push technology |
| DQO | data quality objective |
| EPA | U.S. Environmental Protection Agency |
| GPS | global positioning system |
| IAG | interagency agreement |
| LA | Libby asbestos |
| L/min | liters per minute |
| µm | micron |
| MACTEC | MACTEC Companies |
| MCE | mixed cellulose ester |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NIOSH | National Institute of Occupational Safety and Health |
| NIST | National Institute of Standards and Technology |
| NPL | National Priorities List |
| OSC | on-site coordinator |
| OSHA | Occupational Safety and Health Administration |
| PCBs | polychlorinated biphenyls |
| PCM | phase contrast microscopy |
| MACTEC | MACTEC Companies |
| PLM | polarized light microscopy |
| RA | removal assessment |
| SAP | sampling and analysis plan |
| SDG | sample delivery group |
| SHSP | site health and safety plan |
| SLC2 | Salt Lake City #2 (original site) |
| SOP | standard operating procedure |
| TEM | transmission electron microscopy |
| USGS | U.S. Geological Survey |
| Volpe Center | John A. Volpe National Transportation Systems Center |
| °F | degrees Fahrenheit |

# Section 1
# Introduction

The U.S. Department of Transportation's John A. Volpe National Transportation Systems Center (Volpe Center) has an Interagency Agreement (IAG) with the U.S. Environmental Protection Agency (EPA) Region VIII for environmental engineering and related support.

Since November 1999, the Environmental Engineering Division (DTS-33) of the Volpe Center has been providing EPA Region VIII with immediate environmental engineering and site assessment support at Libby, MT. The Volpe Center, its contractor CDM Federal Programs Corporation (CDM), and CDM's subcontractor MACTEC Companies (MACTEC), have been requested by EPA Region VIII to conduct walk-through site visits and limited sampling activities to support removal assessment (RA) reporting at two locations within Salt Lake City. These locations were identified, via the U.S. Geological Survey (USGS) or Bureau of Mines publications, to have received asbestos ore or vermiculite from Libby, Montana. Each of the sites has performed either small batch exfoliation, used vermiculite as part of a manufacturing process, or sold vermiculite.

This sampling and analysis plan (SAP) defines sampling and analytical procedures that will be used for conducting expanded media sampling at the former Vermiculite Intermountain facility SLC2 in the vicinity of 333 West 100 South, Salt Lake City, Utah.

## 1.1 Project Objectives

The objectives of the Libby Sister Sites (Region VIII) project are to:

1) Determine if any potential sources of Libby Amphibole (LA) (tremolite/actinolite series) asbestos contamination are present at the site related to the processing of vermiculite ore. Potential sources to be investigated include soil, waste/product, dust inside buildings, and ambient air.

2) Document any observed evidence of vermiculite product or other related waste with detailed notes and digital photographs.

Determine the vertical and horizontal extent of asbestos contamination.

## 1.2 Project Organization and Responsibilities

Organization and responsibilities specific to this field investigation are listed in this section. For this data collection effort, key management personnel are as follows:

| Individual | Role |
|---|---|
| Floyd Nichols | EPA On-Scene Coordinator (OSC) |
| John McGuiggin | Volpe Center Project Manager |
| Paul Kudarauskas | Volpe Center Field Team Member |
| Tim Wall | CDM Task Order Manager |
| Frank Morris | CDM Task Leader |
| Tommy Cook | CDM Field Team Member (soils/waste/product) |
| Jennifer Oxford | CDM Quality Assurance Coordinator |
| Brian Stewart | MACTEC Task Leader |
| Melissa Petrak | MACTEC Field Team Member (dust/air) |

The entire field and data gathering effort will be conducted by a team consisting of one CDM member who will be responsible for the soil and waste/product sampling and one MACTEC member in charge of the dust sample collection and ambient/personal air sampling. The team will have a designated Volpe Center team leader. The contractor team lead will have prior experience with performing similar activities under the EPA Region VIII Libby Asbestos Project. A Volpe Center and/or EPA representative will accompany the field team and will work with contractor personnel to determine the site-specific sampling requirements for each site.

# Section 2
# Project Background

## 2.1 Source of the Vermiculite

The Town of Libby is located in the extreme northwest corner of Montana. According to historical mining records, up to 80 percent of the world's vermiculite has come from the W.R. Grace Vermiculite Mine located on Zonolite Mountain approximately seven miles northeast of Libby. Vermiculite is a mineral that is used in various building materials and textiles. Disseminated within the enormous deposit of vermiculite on Zonolite Mountain is the mineral tremolite, a rare and exceedingly toxic form of asbestos. Over the approximately 60-year life of the mine, tremolite asbestos was released into the environment as a by-product of the mining and ore-processing activities.

The Zonolite Mine began operation in 1924 by owner Edward Alley. In 1925, Great Northern Railroad shipped the first boxcar of "zonolite" from Libby to an Ohio company that used it to insulate bank vaults, office safes, and filing cabinets. Other firms used the material to make building boards and roofing materials. Processing the material was straightforward. The vermiculite ore was stripped from the mine and hauled in trucks to a mill, where it was separated into various commercial sizes through a screening system. Some of the ore was shipped untouched. Other material was sent to an expansion plant where it was run through ovens at about 2,000 degrees Fahrenheit (°F), causing the material to expand to 15 times its original size. In 1939, Alley's Zonolite Mine merged with another mining company that eventually became known as the Zonolite Co.

In 1963, the company was sold to W.R. Grace and Co. who expanded the operation and increased production. Through the '60s, '70s, and '80s, millions of tons of Libby vermiculite ore were shipped by rail to numerous processing plants in 30 states and six foreign countries.

## 2.2 Environmental Setting

EPA has determined that the vermiculite ore mined from the mountains surrounding Libby, MT is contaminated with LA asbestos. The ore was shipped throughout the United States both as a processed and unprocessed material. The EPA has been conducting various investigations to determine other potentially contaminated properties (outside of Libby), which may have been impacted by the Libby mining operations. In support of these investigations, the Volpe Center has been requested by EPA Region VIII to conduct an assessment at the former Vermiculite Intermountain facility in Salt Lake City, CO. This location was identified by USGS and Bureau of Mines publications as a site that received ore or vermiculite from Libby, MT. Each of the sites requiring further investigation either performed small batch

exfoliation, used vermiculite as part of a manufacturing process, or sold vermiculite directly.

This SAP defines sampling and analytical procedures that will be used for conducting additional media sampling at the former Vermiculite Intermountain facility in Salt Lake City, Utah. The site where the former plant was located is now owned by Utah Power (Pacific Corporation). The footprint of the now demolished popping plant and former railroad spur are adjacent to and overlap onto an electrical substation.

## 2.3 Previous Investigations

### 2.3.1 Site Description/Known History

SLC2 is located at 100 South 330 West just south of the Delta Center in downtown Salt Lake City. The site is situated between a power transfer station and an asphalt parking lot. Site detail of SLC2 is illustrated on Figure 2-1. The aerial photograph shown in the figure was taken in 2000 from digital imagery obtained from Olympus Aerial Surveys, Inc. According to historical records, SLC2 was the original location for the Intermountain Insulation Company (formerly Vermiculite Intermountain) processing facility. The site (area shown in red) is bordered on the north by 100 South Street and Artistic Printing Company, on the west by 400 West Street, on the south by Utah Paperbox Company, and on the east by an asphalt parking lot leased by AMPCO. The former processing facility is now demolished and the site is currently owned in part by Pacific Corporation, a parent company of Utah Power and Light. The original plant boundaries are shown in green.

Historical research conducted by the EPA On-Scene Coordinator prior to any sampling activities indicated that Intermountain Insulation had operated at this site from about 1940 to 1984 before relocating their operations to another site at 733 West 800 South (SLC1). Intermountain Insulation, under license to W.R. Grace Construction Products Division, manufactured and distributed insulation, fireproofing, vermiculite soil conditioner, masonry fill and concrete plaster aggregate until the company went bankrupt in 1987.

The exfoliation facility was formerly known as Vermiculite Intermountain. The company later changed its name to Intermountain Insulation (date unknown). Vermiculite-containing material was shipped to SLC2 via railcars. According to interviews with a previous employee, the material was scattered about the property due to leakage from standing rail cars and from the actual transfer of the material from the railcars to the processing plant.

The original site work, which involved surface and subsurface soil sampling and baseline ambient air sampling, revealed up to 3% LA on the ground surface and up to 18% LA in the subsurface. The investigation was conducted by Ms. Joyce Ackerman (EPA), Mr. Paul Kudarauskas (Volpe Center), Mr. Frank Morris (CDM), and Melissa Petrak (MACTEC) on October 14 through October 16, 2002. The findings are reported in a summary report (CDM 2003a), which will be incorporated into the subsequent focused RA Report. A proactive surface cleanup was reported by the property owner

focused RA Report. A proactive surface cleanup was reported by the property owner (Pacific Corporation) based on results of this initial investigation during the fall of 2002. Written documentation of this effort is currently unavailable. However, the site visit on May 29, 2003 revealed visible contamination still present in the reportedly affected areas.

## 2.4 Contaminant of Concern

The only potential contaminant of concern being investigated at this site is asbestos, specifically the amphibole minerals from the Libby, MT mine. Asbestos fibers are odorless and tasteless and vary in length, structure, and chemical composition. Fibers are microscopic and environmentally persistent. They do not evaporate, burn or dry out from heat, or erode in water. Toxicity of different type fibers varies, but exposure to any one of them can be fatal. Libby amphiboles (LA), especially tremolite and actinolite, are considered by many to be the most toxic.

The human health risks associated with asbestos fibers released in the environment include:

- Malignant mesothelioma, a cancer of the pleural or peritoneal cavity. In early stages of the disease, cancer is found in the lining of the chest cavity near the lung and heart or in the diaphragm. Mesothelioma may spread to tissue surrounding the lungs or other organs. Virtually all mesothelioma cases are attributable to asbestos exposure.

- Asbestosis, the scarring of the tissue of the lung itself from inhalation of fibers. It ranges in severity from mild impairment to disabling and eventually fatal.

Asbestos and smoking both cause lung cancer, but a population with a history of smoking combined with exposure to asbestos creates a much higher risk of developing asbestos-related diseases.

PCB levels from biased soil samples are also being considered because the site is associated with an electrical substation. However, results will only be evaluated at this time to see if PCBs are present and if they would be a potential problem for removal and/or land disposal of soils.

# Section 3
# Data Quality Objectives

To ensure that data of sufficient quality and quantity are collected to meet project objectives, the data quality objective (DQO) process (EPA 2000) was utilized to develop DQOs for the soil, waste/product, dust, and air sampling tasks. The DQO process is a series of steps based on the scientific method that are designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended purpose. The DQO process consists of the following seven steps:

| | |
|---|---|
| Step 1: | State the Problem; |
| Step 2: | Identify the Decision; |
| Step 3: | Identify Inputs to the Decision; |
| Step 4: | Define the Study Boundaries; |
| Step 5: | Develop a Decision Rule; |
| Step 6: | Specify Limits on Decision Errors; and |
| Step 7: | Optimize the Design for Obtaining Data. |

During the first six steps of the process, the planning team develops decision performance criteria (i.e., DQOs) that are used to develop the data collection design. The final step of the process involves developing data collection design based on DQOs.

## 3.1 Problem Statement

This plan was developed at the request of the Volpe Center to determine if the former Vermiculite Intermountain facility in Salt Lake City, Utah (now an identified Libby Sister Site) has been impacted by asbestos. Materials present at the site, including soil, dust, and waste/product may contain LA. Also, these materials could potentially produce airborne asbestos within and around the site. Both the bulk materials and any airborne asbestos fibers could present a hazard to anyone located in and surrounding the area of the former processing plant.

The stakeholders associated with decisions made for this site include the Volpe Center, U.S. EPA Region VIII, current owner of the site, Utah Department of Environmental Quality (UDEQ), and any other regulatory agency that addresses health and safety standards for asbestos.

Any affirmative response to the above problem statements presented above will generate alternative actions to address the decision. The following alternative actions could be initiated:

(a) Initiate removal or remedial action (i.e., cover exposed areas) of the wastes/product at the site.

(b) Conduct further investigation to determine if the asbestos concentrations are associated with the Libby vermiculite ore (i.e., alternative analyses).

(c) Take no action.

## 3.2 Identify the Decision

Data collected during this assessment will be used to determine if this particular Libby Sister Site has been impacted by LA asbestos. Specifically, the data will be used to answer the following questions:

1) Can any of the wastes/products or soils be considered LA asbestos-containing materials and dust. What are their concentrations?

2) How widespread is the contamination?

The above alternative decisions could be modified depending on the LA concentration (i.e., asbestos toxicity) determined at the site.

## 3.3 Inputs to the Decision

The purpose of this step is to identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statements.

According to the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations (EPA 1990), a friable asbestos-containing material is defined as "any material containing more than 1 percent asbestos as determined using polarized light microscopy (PLM), that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure." Therefore, to answer the first question, the decision-makers need to know the concentrations of asbestos in the soil and waste/product to determine if they are an asbestos-containing material (ACM) using methods described in Section 5.0 and detailed in Appendix D. The decision-makers also need to know the concentration of asbestos in the breathing air surrounding any personnel coming in contact with ACM or disturbing the environs. This will allow them to determine if those concentrations are above regulatory or other risk-based levels that may pose a threat to human health.

The second question can be answered by evaluating the spatial distribution and concentration of the soil samples. These results will state whether or not asbestos was identified, what type (i.e., LA or chrysotile), and how widespread soil contamination is with respect to the proposed grid or transect locations. Positive microvac samples from surrounding properties will help determine if airborne contamination has migrated offsite.

EPA toxicologists and risk managers will evaluate the asbestos levels and determine whether or not a health threat exists on or off site.

## 3.4 Boundaries for the Removal Assessment

This step defines the spatial and temporal boundaries for the assessment.

*Spatial Boundaries*

Concerning the soil and waste/product sampling, the horizontal boundaries for the assessment are approximately the property boundaries (until access agreements are in place for offsite sampling). The vertical boundaries for laboratory analytical sampling are from approximately 1.5 feet below the exposed solid surface to the top of the highest pile or mound of soil. Soil borings will advance to depths below suspected fill as determined by visual inspection. Unless vermiculite is observed in the subgrade fill, sampling will not begin until a depth equivalent to the elevation of the adjacent SLC2 gravel lot is reached. Vertical boundaries can be extended downward based on visual determination to describe the depth of vermiculite or product contamination. For microvac samples, the spatial boundaries for the dust sampling include the interior (including the ceiling) of any onsite building or any equipment planned to be moved offsite. If any ambient air samples are taken, the horizontal boundaries are the property boundaries associated with this particular Libby Sister Site and the vertical boundaries are from the ground surface to approximately six feet above ground (breathing zone). For the personal air monitoring, the boundary is the breathing zone of the affected person.

*Temporal Boundaries*

Temporal boundaries include the time frame from when the former site ceased operation (stopped processing vermiculite) through the time of sampling.

## 3.5 Decision Rule

The purpose of this step is to define the parameter of interest, specify the action level (if known), and integrate previous DQO outputs into a single statement/statements that describes a logical basis for determining whether the site has been impacted by asbestos. The parameters of interest are the concentrations of asbestos in soil, waste/product, and air (including the presence or absence of asbestos in the dust). While the primary form of asbestos at the Libby site is the tremolite-actinolite solution series, the combined concentration of all forms of asbestos may be used for decision-making. Site specific action levels for soil and waste/product will be determined by EPA toxicologists and risk managers only if concentrations are considered a potential health threat at this site.

## 3.6 Specify Tolerable Limits on Decision Errors

The purpose of this step is to specify the decision-maker's acceptable limits on decision errors. Decision-makers are interested in knowing the true value of the asbestos concentrations. There are several reasons why decision-makers may not know the true asbestos concentration in soil and waste/product:

1) There may be a high degree of variability of asbestos concentration within a sample. Although a sample may be thoroughly mixed, only a small portion of the sample is used for the analysis. This could either result in an under- or over-estimate of the actual asbestos concentration.

2) Other fibers with optical properties similar to asbestos minerals may give false positive interferences. This could result in an over-estimate of the actual asbestos concentration.

3) The optical properties of asbestos may be obscured by a coating on the fibers. This could result in an under-estimate of the actual asbestos concentration.

4) Fibers finer than the resolving power of the microscope (about 0.3 μm) will not be detected. This could result in an under-estimate of the actual asbestos concentration.

5) Heat and acid may alter the index of refraction of asbestos and change its color. This could result in an under-estimate of the actual asbestos concentration.

The null hypothesis for the assessment is that the soils and waste/product have LA asbestos concentrations less than 1 percent or greater and the LA asbestos concentrations in the air and dust are above the regulatory levels.

A false positive or "Type I" decision error refers to the type of error made when the null hypothesis is rejected when it is actually true and a false negative to "Type II" decision error refers to the type of error made when the null hypothesis is accepted when it is actually false. For this assessment, a Type I decision error would result in deciding that soil, waste/product, or air contained asbestos that are below the action levels (i.e., "clean") when they actually did not. A Type II decision error would result in deciding that soil, waste/product, or air contains LA asbestos above the action level (i.e., "dirty") when they actually did not. The closer the reported concentration is to the action level, the higher the probability that an incorrect decision will be made and, therefore, a "gray region" may be established that surrounds the action level. However, for this project, no "gray regions" have been established.

The PLM method for soil and waste/product is semi-quantitative and lacks the necessary precision to establish a "gray region." Therefore, given the lack of quantified analytical precision at the action level, a tolerable decision limit for soil and waste/product analyses of +100% of the action level is reasonable to allow the decision-makers to exercise professional judgement and limit Type I errors. A Type II (low bias) error rate of 100 percent less than the action level would mean that a zero percent result would still lie within the allowable error range. By having a decision error limit of ±100 percent, this allows the decision-maker the option to either have the sample reanalyzed, analyzed by another method (e.g., transmission election microscopy [TEM]), or determine that a site has been impacted based on professional judgment.

For air samples, the "worst case" air samples will be used to determine if a site has been impacted by asbestos. Therefore, a "gray region does not need to be established. However, because human health and safety are involved, a decision error limit below the action level of -50 percent of the action level for air is established. By having a decision error limit of -50 percent for air samples, this allows the decision-makers the option to either have the sample further analyzed (e.g., counting more grids), reanalyzed, analyzed by another method, (e.g., phase contrast microscopy [PCM]), or determine that a site has been impacted (i.e., pose a possible health hazard) based on professional judgment.

## 3.7 Optimize the Decision for Obtaining Data

The purpose of this step is to identify the most resource-effective sampling design that generates data that satisfy the DQOs in the previous steps. The sampling program described in this SAP is consistent with the DQOs and project objectives for the assessment. However, if during the period of sample collection and/or evaluation, it becomes apparent that the quantity and/or distribution of samples is not sufficient for obtaining the data required to properly characterize soil, waste/product, or air for this assessment, the number, distribution, or methods may be modified to reflect the specific needs of the project. Any changes to this SAP will be approved by EPA and the Volpe Center prior to implementation. In addition, any deviations to this SAP will be noted in the applicable field logbook and subsequently discussed in data summary reports.

# Section 4
# Field Activities and Sampling Procedures

CDM was tasked by the Volpe Center to provide all personnel, material, equipment, and supplies to complete the tasks identified below related to sampling and investigative support at the SLC2 site. This section describes the procedures that will be followed for information gathering, sample collection, handling, shipping, analysis, and documentation.

## 4.1 Site Information and Access Agreements

As part of the onsite investigation activities, CDM will gather and verify current and historical information at the SLC2 site (if not previously done). An interview or meetings with the current site contact (property owner) may have already been accomplished or arranged for by the EPA or the Volpe Center prior to arrival onsite. Signed access agreements and insurance documents (if applicable) will be required before any sampling activities commence.

## 4.2 Site Investigation and Photographic Documentation

CDM will take detailed notes and digital photographs during the investigation and will document the existence of any suspect asbestos materials. Differential global positioning system (GPS) locations and photographs will be taken and logged for sample points in accordance with CDM Standard Operating Procedure (SOP) 4-2 Photographic Documentation of Field Activities.

## 4.3 Soil Sampling

### 4.3.1 Selecting Soil Sampling Locations

Soil samples will be collected from unpaved areas outside of the buildings, on and off site. Additional sampling may include direct-push technology (DPT) methods to multiple depths, including possible coring through asphalt or concrete.

Approximately 70 surface and subsurface soil samples are currently proposed (Figure 4-1) as part of the expanded RA. Actual locations and depths of sample locations are dependent on the needs and goals of the EPA OSC and Volpe Center field team member. Locations will be determined in the field and will be dependent on observed conditions. Grab samples were previously collected for the first walk-through sampling effort (CDM 2003a); however, five-point composite sampling has been recommended for further surface soil investigation of this site. Sampling efforts may change at the discretion of the EPA OSC. The type and location of samples that are collected will be documented on the field sample data sheets (FSDS) (Appendix A).

Approximately 10 subsurface soil borings will be installed outside the perimeter of the former processing building (Figure 4-1). The soil borings will be advanced to at least 1.5 feet below the estimated original ground surface (existing at the time of plant

operations) using DPT methods. Collection of these samples will be dependent on access to the properties.

Approximately two composite soil samples will be collected for PCB analyses. Discrete locations for these samples will be biased towards locations around the base of existing or previously known electrical transformers.

Any additional sampling procedures or changes to the plan (e.g., concrete coring) will be documented in detail in the applicable field logbook.

### 4.3.2 Sample Identification

Each soil sample will be labeled with two unique codes indicating an index identification and location identification. The first code is taken from a list of unique alpha-numeric sequence prepared by CDM for the Region VIII Libby Sister Sites. This coding system is designed to prevent accidental duplication of sample identification numbers and ensures that all samples have a unique identification number assigned to them. These codes start at 1R8-xxxx, with the "1R8" corresponding to the soil sampling team (CDM) and the last five numbers are sequentially numbered so that thousands of unique codes are available. To ensure that the laboratory is "blind" and does not receive certain specific information about a sample, only the index identification code, along with sample date and time, will be used to label sample containers.

The second sample code is a field identification code used by CDM to provide each soil sample with a unique identification code that will allow for the tracking and retrieval of information concerning each sample. Each surface soil sample will be identified by a site identifier, a location identifier, a media identifier, a station identifier, and the depth range of sample collection in inches.

An example is LSS-UTSL-SO-S01-00-02 which indicates that a sample was collected by CDM as part of the Libby Sister Sites asbestos investigation (LSS), that it was collected from the former facility in Salt Lake City, UT (UTSL), that it was a soil sample (SO), from grid station 01 (G01), and that it was collected from a depth of 0 to 2 inches (00-02). The station identifier may also be a feature such as a railroad (R##) or a traverse (T##). The first letter of the location identifier will be changed to a D for duplicate samples (e.g., DTSL). This coding system may be modified to suit field conditions and any modifications will be clearly described in the applicable field logbook.

### 4.3.3 Collecting Soil Samples

All soil samples will be prepared in accordance with the CDM Close Support Facility Soil Preparation Plan (CDM 2003b) and analyzed by National Institute of Occupational Safety and Health (NIOSH) Method 9002, Asbestos (bulk) by PLM Method 9002 (Appendix D). All soil samples will be collected in accordance with CDM Technical SOP 1-3 Surface Soil Sampling and SOP 1-4 Subsurface Soil Sampling (Appendix B), with modifications. The following modifications to SOP 1-3 and SOP 1-4 have been reviewed and approved.

Section 2.2, Discussion - Sample depth for surface soil will generally be 0 to 2 inches from the current ground surface. However, if a sample is required from a compacted dirt road, the depth from 0 to 1 inch will be acceptable assuming a sufficient amount of soil can be obtained. Limited subsurface soil samples may also be required; however, depths will likely be limited to 1.5 feet. Composite samples will be composed of nearly equal portions of soil from five randomly discrete locations within a horizontal radius of approximately 25 feet. The field composite sample will be obtained from an aliquot of total volume of homogenized soil. The actual composite sample for PLM analysis will be prepared at the CDM laboratory in Denver. The laboratory sample will be a split of the processed (i.e., dried, crushed, and homogenized) volume of soil. If vermiculite is observed within the 25 foot radius, it will be included as at least one discrete biased portion of the field sample. Generally, grid and/or traverse segment size will be measured on 50-foot centers.

Section 4.0, Required Equipment - Neither ice bags nor blue ice will be used. Powder-free nitrile gloves will be used for sample collection. No pans, trays, or bowls are necessary, since samples will be placed directly into zipper-top bags. Since the sampling is for asbestos, rather than metals or organic compounds, the use of stainless steel or Teflon-lined sampling instruments is determined not to be necessary. The sampling devise may be a garden bulb planter, trowel, DPT macrocore, or other similar sampling device. A list of equipment that may be used for sampling is included in Table 4-1.

Section 5.2.3, Method for Collecting Samples for Nonvolatile Organic or Inorganic Compound Analysis - One-gallon zipper-top bags will be used as sample containers. The one-gallon bags will be filled at least half full. Sampling information will be written directly on the bags using a permanent marker. Sampling instruments do not need to be constructed of stainless steel or Teflon lined. Trays and bowls will not be used, as samples will be placed directly into zipper-top bags. Field homogenization will be performed by manipulating the sampled material inside the zipper-locked bag. All samples will be double bagged for shipping to the Denver lab and further processing.

## 4.3.4 Sample Documentation

Sampling activities during this assessment will be documented in the applicable field logbooks (and on FSDSs, Appendix A) to be maintained by the field team in accordance with CDM SOP 4-1 Field Logbook Content and Control (Appendix B). The field team leader will be responsible for maintenance and document control of the field logbook.

## 4.3.5 Sample Custody, Packaging, and Shipping

This section details the sample custody and the classifying, identifying, labeling, packaging, and transporting of soil samples collected during this investigation. Procedures will be in accordance with CDM SOPs 1-2 Sample Custody and 2-8 Packaging and Shipping of Environmental Samples (Appendix B) as described below.

Sample classification is necessary to ensure the protection of personnel involved in the shipment of samples, and to maintain the integrity of each sample. Samples obtained at uncontrolled hazardous waste sites are classified as either environmental or hazardous samples. All samples collected during this investigation will be classified as environmental.

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, chain-of-custody (COC) records will be used. The COC record is employed as physical evidence of sample custody and control, and provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. COC procedures will follow the requirements set forth in CDM SOP 1-2 Sample Custody. The following modifications to SOP 1-2 have been reviewed and approved:

Section 5.2, Sample Labels and Tags - Rather than using labels or tags, samples will be identified by writing sample index information directly on the one-gallon zipper-top bags using permanent markers.

Samples collected during this investigation will be packaged and shipped in accordance with CDM SOP 2-8 Packaging and Shipping of Environmental Samples (Appendix B), with modification. The proposed modifications to SOP 2-8 are as follows:

Section 4.0, Required Equipment - No vermiculite or other absorbent material will be used. No bubble wrap or ice will be used.

Section 5.0, Procedures - Lining the cooler with a garbage bag is determined not to be necessary since the samples will already be double-bagged. No vermiculite or other absorbent material will be used to pack the samples. No ice will be used.

### 4.3.6 Quality Control Samples

Quality control (QC) data are necessary to determine precision and accuracy of sample collection techniques and to demonstrate the absence of interference and/or cross-contamination. For this investigation, a soil QC sample will consist of a duplicate taken from an environmental sample in the field following homogenization in the Zipper-top bag.

Soil duplicate samples will be analyzed at a rate of one per twenty soil samples per site (i.e., 5 percent). For each group of twenty sequentially collected natural samples (e.g., 1R8-0001 through 1R8-0010), any one of the twenty samples may be duplicated. The duplicate sample will receive a unique index identification code.

Field duplicate samples may be collected in the field where one portion of this sample (split) will be given to a stakeholder representative. These split samples are collected the same as a duplicate sample using a unique index identification code. However, the remainder of the sample will be archived at Camp Dresser & McKee Inc. (CDM

Inc.'s) laboratory located in Denver, Colorado. A COC form is completed without identifying any analyses and should identify the sample was split as noted in the comment section. The samples, signed copy of the COC, and corresponding field data sheet will be transferred to the stakeholder representative.

No other soil QC samples (e.g., field blanks, interlaboratory splits, etc.) are planned. Rinsate samples are used to evaluate the effectiveness of decontamination procedures. The soil analyses used for this project have a relatively high limit of detection and cross-contamination from sampling equipment would have to be extreme to be detectable in a sample. Decontamination of equipment to be visually clean will be sufficient to avoid cross-contamination and, therefore, no rinsate blanks will be collected.

### 4.3.7 Equipment Decontamination

Equipment used to collect, handle, or measure soil samples will be decontaminated in accordance with CDM SOP 4-5 Field Equipment Decontamination at Nonradioactive Sites, with modification (Appendix B). The following modifications to SOP 4-5 have been reviewed and approved:

Section 5.0, Procedures - Decontamination water will not be captured and will be discharged to the ground at the site.

Section 5.3, Sampling Equipment Decontamination - ASTM Type II deionized (DI) water will not be used. Rather, locally available DI water will be used. Decontamination water will be discharged to the ground at the site.

Section 5.6, Waste Disposal - Decontamination water will not be captured and will not be packaged, labeled, or stored as investigation-derived waste.

The decontamination procedure for non-disposable equipment consists of a tap water and alconox wash with brush scrubbing, followed by a tap water rinse, and final DI water rinse. The equipment will then be allowed to air-dry before being wrapped in clean plastic or aluminum foil. All equipment will be decontaminated before coming into contact with any sample. Rinse water will be discharged to the ground at the site. Any deviations from the decontamination procedures will be recorded in the appropriate field logbook.

### 4.3.8 Health and Safety

All sampling will be performed in accordance with applicable EPA, Occupational Safety and Health Administration (OSHA), corporate, and site health and safety requirements. CDM has prepared a Site Health and Safety Plan (SHSP) for the site that is attached as Appendix C.

# 4.4 Waste / Product Sampling

## 4.4.1 Selecting Sample Locations

Waste/product sampling is not currently scoped for this site. If new sources of product are discovered, then additional sampling locations may be opportunistic. Approximately two waste/product samples will be collected (if found) at the project site. Potential locations would be from around the foundation of the structure used for processing or containing product and the other from outside where the product was stockpiled.

The specifics of any waste/product sampling locations will be determined on-site. The EPA OSC and/or Volpe Center Field Team Member working with the sampling team will determine the number, locations of waste/product samples to be collected at this site and the analytical method. The EPA OSC will also direct the CDM team on the required depth and composite nature of each sample.

## 4.4.2 Sample Identification

Each bulk sample will be identified with a unique index identification code. The index identification code is a sequential list of sample numbers (IR8-XXXX) that will be used for all of the samples collected by the soil team including soil and bulk waste/product samples. This coding system (see Section 4.3.2) is designed to prevent accidental duplication of sample identification numbers and ensures that all samples have a unique identification number assigned to them. To ensure that the laboratory is "blind" and does not receive certain specific information about a sample, only the index identification code, along with sample date and time, will be used to label sample containers.

Each waste/product sample will also be identified by a site identifier, a location identifier, a media identifier, a station identifier, and the depth range of sample collection in inches. An example is LSS-UTSL-WP-P01-00-06 which indicates that a sample was collected by CDM as part of the Libby Sister Sites asbestos investigation (LSS), that it was collected from the former facility in Salt Lake City, UT (UTSL), that it was a waste/product (WP), that it was from pile 01 (P01), and that it was collected from a depth of 0 to 6 inches (00-06). The station identifier may also be a structure such as a building or shed (B##). The first letter of the location identifier will be changed to a D for duplicate samples (i.e., DTSL). This coding system may be modified to suit field conditions and any modifications will be clearly described in the applicable field logbook.

## 4.4.3 Collecting Samples

All waste/product samples will be prepared in accordance with the CDM Close Support Facility Soil Preparation Plan (CDM 2003b) and analyzed in accordance with National Institute of Occupational Safety and Health (NIOSH) Method 9002, Asbestos (bulk) by PLM (Appendix D).

The samples will be collected by placing product or waste material into a one gallon plastic zipper-top bag until it is approximately half full. This bag will then be placed into a second plastic zipper-top bag. All waste/product samples will be double bagged. Sampling personnel will wear disposable nitrile gloves while sampling. A new pair of gloves will be donned prior to each sample being collected. Sampling personnel will also wear an appropriate level respiratory protection at all times while collecting waste/product samples.

### 4.4.4 Sample Documentation

Sampling activities during this assessment will be documented in the applicable field logbooks and on FSDSs (Appendix A) to be maintained by the field team in accordance with CDM SOP 4-1 Field Logbook Content and Control (Appendix B). The field team leader will be responsible for maintenance and document control of field logbooks.

### 4.4.5 Sample Custody, Packaging, and Shipping

This section details the sample custody and the classifying, identifying, labeling, packaging, and transporting of waste/product samples collected during this investigation. Procedures will be conducted in accordance with CDM SOPs 1-2, 2-8, and 4-5 (Appendix B) as described below.

Sample classification is necessary to ensure the protection of personnel involved in the shipment of samples, and to maintain the integrity of each sample. Samples obtained at uncontrolled hazardous waste sites are classified as either environmental or hazardous samples. All samples collected during this investigation will be classified as environmental.

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, COC records will be used. The COC record will be employed as physical evidence of sample custody and control, and provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. COC procedures will follow the requirements set forth in CDM SOP 1-2 Sample Custody. The following modifications to SOP 1-2 have been reviewed and approved:

Section 5.2, Sample Labels and Tags - Rather than using labels or tags, samples will be identified by writing sample information directly on the one-gallon zipper-top bags using permanent markers. All samples will be double-bagged.

Samples collected during this investigation will be packaged and shipped in accordance with CDM SOP 2-8 Packaging and Shipping of Environmental Samples (Appendix B), with modification. The following modifications to SOP 2-8 have been reviewed and approved.
Section 4.0, Required Equipment - No vermiculite or other absorbent material will be used. No bubble wrap or ice will be used.

Section 5.0, Procedures - Lining the cooler with a garbage bag is determined not to be necessary since the samples will already be double-bagged. Procedures related to the packaging of bottles do not apply. No vermiculite or other absorbent material will be used to pack the samples. No ice will be used.

### 4.4.6 Quality Control Samples

Quality control data are necessary to determine precision and accuracy of sample collection techniques and to demonstrate the absence of interference and/or cross-contamination. For this investigation, a waste/product QC sample will consist of a duplicate taken from an environmental sample in the field following homogenization in the zipper-top bag.

Waste/product duplicate samples will be analyzed at a rate of one per twenty waste/product samples per site (i.e., 5 percent). For each group of twenty sequentially collected natural samples (e.g., 1R8-0020 through 1R8-0040), any one of the twenty samples may be duplicated. The sample will receive a unique index identification code as described in Section 4.4.2.

Split samples may be collected when waste/product samples are collected on property owned (or once owned) by Vermiculite Intermountain (Table 1-1). Split samples may be collected for 100 percent of samples collected on these properties. A split sample will be collected in the same manner as a duplicate sample using a unique index identification code. However, the sample will not be sent to the Denver laboratory for processing and subsequent analysis. A COC form will be completed without identifying any analyses or laboratory. The COC will identify the sample that was split as noted in the comment section. The samples, signed COC, and corresponding field data sheets will be transferred to the stakeholder's representative. A copy of the signed COC will be retained for the project records.

No other waste/product QC samples (e.g., field blanks, interlaboratory splits, etc.) are planned. Rinsate samples are used to evaluate the effectiveness of decontamination procedures. The soil analyses used for this project have a relatively high limit of detection and cross-contamination from sampling equipment would have to be extreme to be detectable in a sample. Decontamination of equipment to be visually clean is sufficient to avoid cross-contamination and, therefore, no rinsate blanks will be collected.

### 4.4.7 Equipment Decontamination

Equipment used to collect, handle, or measure waste/product samples will be decontaminated in accordance with CDM SOP 4-5 Field Equipment Decontamination at Nonradioactive Sites, with modification (Appendix B). The following modifications to SOP 4-5 have been reviewed and approved:
Section 5.0, Procedures - Decontamination water will not be captured and will be discharged to the ground at the site.

Section 5.3, Sampling Equipment Decontamination - ASTM Type II DI water will not be used. Rather, locally available DI water will be used. Decontamination water will be discharged to the ground at the site.

Section 5.6, Waste Disposal - Decontamination water will not be captured and will not be packaged, labeled, or stored as investigation-derived waste.

The decontamination procedure for non-disposable equipment will consist of a tap water and alconox wash with brush scrubbing, followed by a tap water rinse, and final DI water rinse. The equipment will then allowed to air-dry before being wrapped in clean plastic or aluminum foil. All equipment will be decontaminated before coming into contact with any sample. Rinse water will be discharged to the ground at the site. Any deviations from the decontamination procedures will be recorded in the appropriate field logbook.

### 4.4.8 Health and Safety

All sampling will be performed in accordance with all applicable EPA, OSHA, corporate, and site health and safety requirements. CDM has prepared a SHSP for the site that is attached as Appendix C.

## 4.5 Microvacuum Dust Sampling

### 4.5.1 Selecting Sample Locations

Air sampling may be recommended at the site. Microvacuum (dust sampling) locations will be determined based on the size and number of buildings on the project site, current and historic uses of the buildings, and current and historic site conditions. In the case of multiple story buildings or larger buildings, it may be necessary to collect additional microvacuum dust samples to get a more representative sample of the buildings.

The specifics of the dust sampling locations will be determined on site. The Volpe Center Field Team Member working with the sampling team will determine the number and location of microvacuum dust samples to be collected at this site.

### 4.5.2 Sample Identification

Each dust sample will be identified with a unique index identification code. The index identification code is a sequential list of sample numbers (2R8-XXXX) that will be used for all of the samples collected by the air team including air, dust and personal air samples. This coding system is designed to prevent accidental duplication of sample identification numbers and ensures that all samples have a unique identification number assigned to them. To ensure that the laboratory is "blind" and does not receive certain specific information about a sample, only the index identification code, along with sample date and time, will be used to label sample cassettes.

Each dust sample will also be identified by a site identifier, a location identifier, a media identifier, and a station identifier, and a sequential number indicating the number of sample from that building.

An example is LSS-UTSL-DU-B01-3-00 which indicates that a sample was collected by CDM as part of the Libby Sister Sites asbestos investigation (LSS), that it was collected from the former facility in Salt Lake City, UT (UTSL), that it was a dust sample (DU), from building 01 (B01), that it was the third sample from that building (3), and space filler to keep the number of characters in the sample code consistent (00). The first letter of the location identifier will be changed to an F for field blanks. This coding system may be modified to suit field conditions and any modifications will be clearly described in the applicable field logbook.

### 4.5.3 Collecting Samples

Microvacuum dust samples will be collected by drawing air through a MCE filter (0.45 μm pore size) at a flow rate of 2.0 L/min for a minimum sampling time of two minutes or until all visible dust or particulate matter has been removed from the sampling area, whichever comes first. The details of the method are provided in ASTM Standard D-5755-95, Microvacuum Sampling and Indirect Analysis Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations (Appendix D). For the purposes of this project there will be one modification to the ASTM Method. The following modification to ASTM Method D-5755-95 is noted:

Section 8.7, Sample Area - The ASTM method indicates that a 100 $cm^2$ sampling area be vacuumed per cassette. In order to obtain a more representative dust sample from several areas within each building, MACTEC will vacuum three separate 100 $cm^2$ sampling areas per sampling cassette. Therefore each cassette will represent the dust from a 300 $cm^2$ area.

### 4.5.4 Sample Documentation

Sampling activities during this assessment will be documented in the applicable field logbooks and on FSDSs (Appendix A) to be maintained by the field team in accordance with CDM SOP 4-1 Field Logbook Content and Control (Appendix B). The field team leader will be responsible for maintenance and document control of field logbooks.

### 4.5.5 Sample Custody, Packaging, and Shipping

This section details the sample custody and the classifying, identifying, labeling, packaging, and transporting of dust samples collected during this investigation.

Sample classification is necessary to ensure the protection of personnel involved in the shipment of samples, and to maintain the integrity of each sample. Dust samples collected during this assessment will be classified as environmental samples.

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, COC records will be used. The COC record will be employed as physical evidence of sample custody and control, and provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. COC procedures will follow the requirements set forth in CDM SOP 1-2 Sample Custody, with modifications (Appendix B). The following modifications to SOP 1-2 have been reviewed and approved:

Section 5.2, Sample Labels and Tags - A label will be affixed to each air sampling cassette prior to being shipped to the appropriate laboratory. This number will correspond to the number assigned to that particular sample in the field data sheets.

Samples collected during this investigation will be packaged and shipped in accordance with CDM SOP 2-8, Packaging and Shipping of Environmental Samples (Appendix B) and ASTM Standard D-5755-97 (Appendix D), with modification. The following modifications to SOP 2-8 are as follows:

Section 4.0, Required Equipment - No vermiculite or other absorbent material will be used. No bubble wrap or ice will be used.

### 4.5.6 Quality Control Samples

Quality control methods include both a field and laboratory component. Normally, field personnel will prepare two types of QC samples: duplicates and blanks. However, field duplicates will not be collected for microvacuum samples. In accordance with the ASTM standard, a microvacuum sample must be collected for two minutes or until all visible dust or particulate has been removed from a specified area. Therefore, it may be impossible to duplicate the sampling of dust.

*Field Blanks*

The field team will prepare blank samples for dust by labeling unused filter cassettes and submitting them for analysis.

### 4.5.7 Equipment Decontamination

This project requires the decontamination of all microvacuum sampling equipment (e.g., pumps, cassette, tubing, etc) prior to sampling and prior to leaving the site.

Equipment used to collect, handle, or measure dust samples will be decontaminated in accordance with CDM SOP 4-5 Field Equipment Decontamination at Nonradioactive Sites, with modification (Appendix B). The following modifications to SOP 4-5 have been reviewed and approved:

Section 5.0, Procedures - Decontamination water will not be captured and will be discharged to the ground at the site.

Section 5.3, Sampling Equipment Decontamination - ASTM Type II DI water will not be used. Rather, locally available DI water will be used. Decontamination water will be discharged to the ground at the site.

Section 5.6, Waste Disposal - Decontamination water will not be captured and will not be packaged, labeled, or stored as investigation-derived waste.

The decontamination procedure for non-disposable equipment will consist of a tap water and alconox wash with brush scrubbing, followed by a tap water rinse, and final DI water rinse. The equipment will then be allowed to air-dry before being wrapped in clean plastic or aluminum foil. All equipment will be decontaminated before coming into contact with any sample. Rinse water will be discharged to the ground at the site. Any deviations from the decontamination procedures will be recorded in the appropriate field logbook.

### 4.5.8 Health and Safety

All sampling will be performed in accordance with all applicable EPA, OSHA, corporate, and site health and safety requirements. CDM has prepared a SHSP for the project site that is attached as Appendix C.

## 4.6 Ambient/Personal Air

### 4.6.1 Selecting Sample Locations

If ambient air sampling is conducted, locations will be determined based on the size and number of buildings on the project site, current and historic uses of the buildings, and current and historic site conditions. Ambient air sampling will be performed to determine the asbestos in air concentrations within the buildings.

The EPA OSC and Volpe Center Field Team Member working with the sampling team will determine the number and locations if ambient air samples are to be collected at this site.

Personal air samples will be conducted each day of sampling. The personal air sample will be collected from the breathing zone of the sampler and DPT operator.

### 4.6.2 Sample Identification

Each air sample will be identified with a unique index identification code. The index identification code is a sequential list of sample numbers that will be used for all of the samples collected including ambient and personal air samples. This coding system is designed to prevent accidental duplication of sample identification numbers and ensures that all samples have a unique identification number assigned to them. To ensure that the laboratory is "blind" and does not receive certain specific information about a sample, only the index identification code, along with sample date and time, will be used to label sample cassettes.

Each air sample will also be identified by a site identifier, a location identifier, a media identifier, a station identifier, and the height from ground surface of sample collection, in inches.

An example is LSS-UTSL-AA-B02-2-72 which indicates that a sample was collected by CDM as part of the Libby Sister Sites asbestos investigation (LSS), that it was collected from the former facility in Salt Lake City, UT (UTSL), that it was an ambient air sample (AA), from building 02 (B02), second sample from that building (2), and that it was collected from 72 inches above ground surface (72). The first letter of the location identifier will be changed to an F for field blanks. This coding system may be modified to suit field conditions and any modifications will be clearly described in the applicable field logbook. Personal air samples will be indicated by the alpha characters (PA).

### 4.6.3 Collecting Samples

Air samples will be collected by drawing air through a MCE filter (0.45 μm pore size) at a specified flow rate for a specified period of time. The details of the method are provided in EPA SOP 2015 Asbestos Sampling (Appendix D). Under normal circumstances, ambient air samples will be collected at a flow rate of 10 L/min over a 6- to 7-hour sampling period. This results in a total sampling volume 4200 liters.

Depending on the sampling conditions, work activities, the level of asbestos in the air, and the level of interfering particles in the air, the flow rate, total sampling time, and/or sampling volume may require modifications. The decision to modify the flow rate, time, or volume will be made by the Volpe Center Field Team Member working with the sampling team.

### 4.6.4 Sample Documentation

Sampling activities during this removal assessment will be documented in the applicable field logbooks (and on FSDSs, see Appendix A) to be maintained by the field team in accordance with CDM SOP 4-1 Field Logbook Content and Control (Appendix B). The field team leader will be responsible for maintenance and document control of field logbooks.

### 4.6.5 Sample Custody, Packaging, and Shipping

This section details the sample custody and the classifying, identifying, labeling, packaging, and transporting of air samples collected during this investigation.

Sample classification is necessary to ensure the protection of personnel involved in the shipment of samples, and to maintain the integrity of each sample. Air samples collected during this assessment will be classified as environmental samples.

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, COC records will be used. The COC record will be

employed as physical evidence of sample custody and control, and provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. COC procedures will follow the requirements set forth in CDM SOP 1-2 Sample Custody, with modifications (Appendix B). The following modifications to SOP 1-2 have been reviewed and approved:

Section 5.2, Sample Labels and Tags - A label will be affixed to each air sampling cassette prior to being shipped to the appropriate laboratory. This number will correspond to the number assigned to that particular sample in the field data sheets.

Samples collected during this investigation will be packaged and shipped in accordance with CDM SOP 2-8 Packaging and Shipping of Environmental Samples (Appendix B) and ASTM Standard D-5755-97 (Appendix B), with modification. The following modifications to SOP 2-8 have been reviewed and approved:

Section 4.0, Required Equipment - No vermiculite or other absorbent material will be used. No bubble wrap or ice will be used.

## 4.6.6 Quality Control Samples

The field team will prepare one type of QC sample: field blanks.

*Field Blanks*

The field team will prepare blank samples for air by labeling unused filter cassettes and submitting them for analysis.

## 4.6.7 Equipment Decontamination

This project requires the decontamination of all air sampling equipment (e.g., pumps, cassette, tubing, etc) prior to sampling and prior to leaving the site.

Equipment used to collect, handle, or measure air samples will be decontaminated in accordance with CDM SOP 4-5 Field Equipment Decontamination at Nonradioactive Sites, with modification (Appendix B). The following modifications to SOP 4-5 have been reviewed and approved:

Section 5.0, Procedures - Decontamination water will not be captured and will be discharged to the ground at the site.

Section 5.6, Waste Disposal - Decontamination water will not be captured and will not be packaged, labeled, or stored as investigation-derived waste.

The decontamination procedure for non-disposable equipment consists of a tap water and alconox wash with brush scrubbing, followed by a tap water rinse, and final DI water rinse. The equipment will then be allowed to air-dry before being wrapped in clean plastic or aluminum foil. All equipment will be decontaminated before coming into contact with any sample. Rinse water will be discharged to the ground at the site.

Any deviations from the decontamination procedures will be recorded in the appropriate field logbook.

### 4.6.8 Health and Safety

All sampling will be performed in accordance with applicable EPA, OSHA, corporate, and site health and safety requirements. CDM has prepared a SHSP that is specific to this project attached as Appendix C.

# Section 5
# Laboratory Analytical Methods

All soil and waste/product samples will be sent to the following location for sample preparation:
CDM Inc. Laboratory
2710 Walnut Street
Denver, Colorado 80202
Attn: Todd Burgesser
(303)295-3935

All soil and waste/product samples will be processed in accordance with the CDM Close Support Facility Soil Preparation Plan (CDM 2003b) (Appendix D). Following preparation, all soil and waste/product will be analyzed by PLM/NIOSH 9002 (Appendix D). Removal decisions will be based on the fine ground sample portion analytical result.

Any air and dust samples will be sent directly to the analytical laboratory and will not require any preliminary processing at the CDM Inc. Laboratory. Analytical services for soil, waste/product, dust, and air samples will be conducted by one of the following laboratories:

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Attn: Mr. Robert DeMalo
(800) 220-3675 ext. 1256

Reservoir Environmental Services Inc.
1827 Grant Street
Denver, CO 80203
Attn: Ms. Jeanne Orr
(303) 830-1986

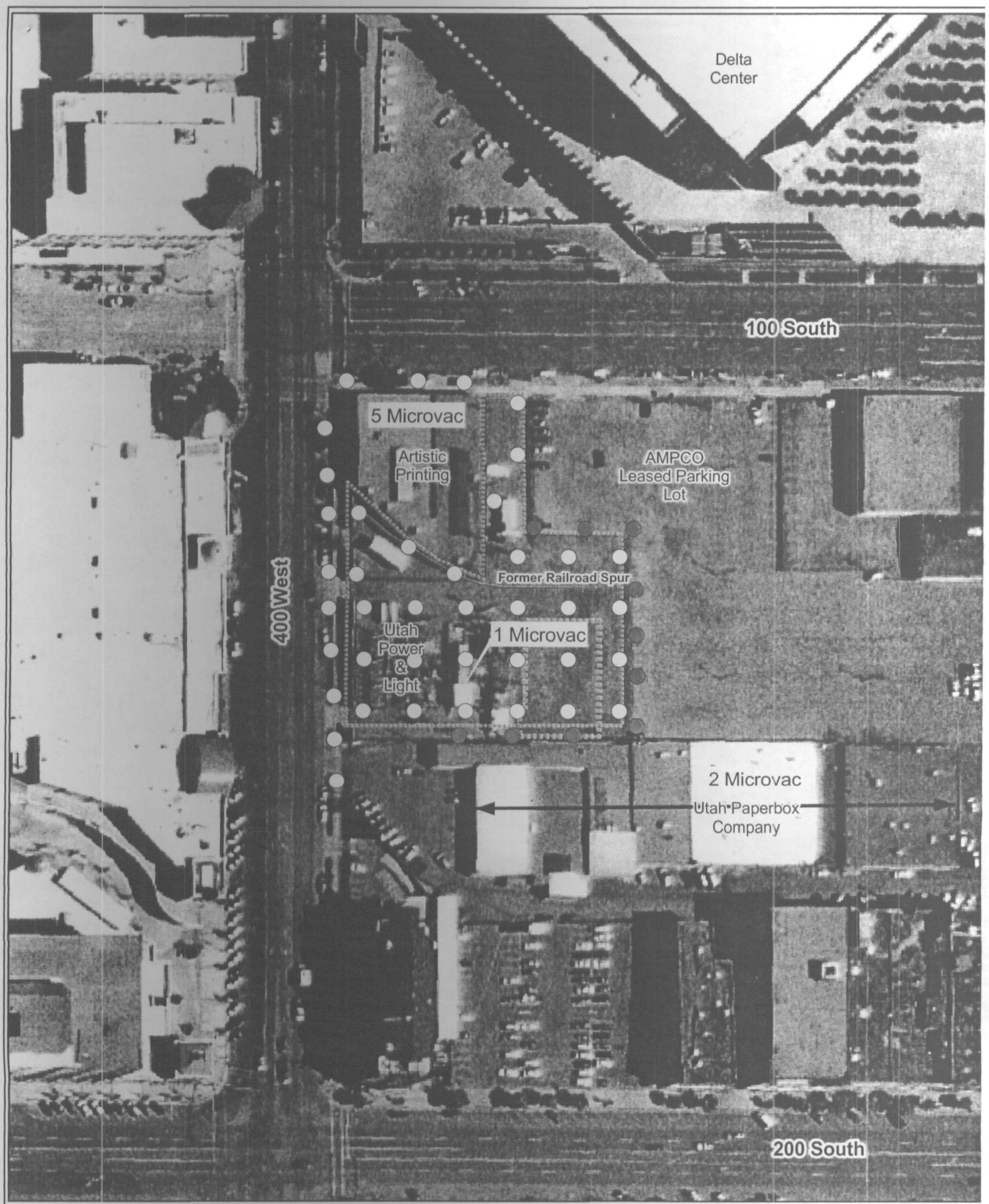
The most appropriate analytical methods for each environmental medium will depend on the type and level of asbestos contamination and on the detection levels needed to assess hazard and/or nature and extent of contamination. Table 5-1 identifies the analytical methods that will be utilized during the assessment. Analytical methods are included as Appendix D.

The laboratory used for all sample analysis will be accredited under the Laboratory Accreditation Program as sponsored by the American Industrial Hygiene Association (AIHA). The laboratory will also actively participate in the NIOSH Proficiency Analytical Testing Program for Laboratory Quality Control for asbestos. Lastly, the laboratory will be fully accredited for TEM and PLM analysis under the National

Voluntary Laboratory Accreditation Program as sponsored by the National Institute of Standards and Technology (NIST).

Soil analyses for PCBs will be conducted directly on field samples without any preprocessing by CDM Inc. The method used for analysis is EPA 8082/8081A. The following laboratory will be used for all analyses other than asbestos:

Alpha Analytical Laboratories
Eight Walkup Drive
Westborough, MA 01581-1019

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